

TABLE 2. CONDUCTIVITIES (*k*) AND CONDUCTANCES (*C*) OF BUILDING AND INSULATING MATERIALS—Continued

These constants are expressed in Btu per (hour) (square foot) (Fahrenheit degree temperature difference.)
Conductivities (*k*) are per inch thickness and conductances (*C*) are for thickness or construction stated, not per inch thickness.

MATERIAL	DESCRIPTION	DENSITY (LB PER CU FT)	MEAN TEMP (FAHR DEG)	CONDUCTIVITY OR CONDUCTANCE		RESISTANCE		AUTHORITY
				(<i>k</i>)	(<i>C</i>)	Per Inch Thickness ($\frac{1}{k}$)	For Thickness Listed ($\frac{1}{C}$)	
WOODS—(continued)	Soft maple, 0 % moisture ^a	42.0	75	0.95	—	1.05	—	(4)
	Sugar pine, 0 % moisture ^a	28.0	75	0.64	—	1.56	—	(4)
	Virginia pine.....	34.3	88	0.96	—	1.04	—	(1)
	West coast hemlock, 0 % moisture ^a	30.0	75	0.79	—	1.27	—	(4)
	White pine.....	31.2	88	0.78	—	1.28	—	(1)
	Yellow pine.....	12.0	90	1.00	—	1.00	—	(3)
	Sawdust, various.....	8.8	90	0.41	—	2.44	—	(1)
	Shavings, various from planer.....	8.8	90	0.41	—	2.44	—	(1)
	Shavings, from maple beech and birch (coarse).....	12.2	90	0.36	—	2.78	—	(1)
	Chemically treated wood fibers held between layers of strong paper.....	3.62	70	0.25	—	4.00	—	(3)
INSULATING MATERIALS BLANKET AND BAT INSULATIONS	Flax fibers between strong paper.....	4.90	90	0.28	—	3.57	—	(1)
	Chemically treated hog hair between kraft paper.....	5.76	71	0.28	—	3.55	—	(3)
	Chemically treated hog hair between kraft paper and asbestos paper.....	7.70	71	0.28	—	3.57	—	(3)
	Hair felt between layers of paper.....	11.00	75	0.25	—	4.00	—	(3)
	Kapok between burlap or paper.....	1.00	90	0.24	—	4.17	—	(1)
	Stitched and creped expanding fibrous blanket.....	1.50	70	0.27	—	3.70	—	(3)
	Paper and asbestos fiber with emulsified asphalt binder.....	4.2	94	0.28	—	3.57	—	(1)
	Cotton insulating bat.....	0.875	72	0.24	—	4.17	—	(3)
	Cotton fibers.....	6.25	90	0.25	—	4.00	—	(1)
	Short Staple Linters, Fireproofed.....	4.50	90	0.24	—	4.17	—	(1)
		1.60	90	0.26	—	3.85	—	(1)
		0.85	90	0.29	—	3.45	—	(1)
		0.65	90	0.30	—	3.33	—	(1)
	Felted cattle hair.....	13.00	90	0.28	—	3.57	—	(1)
	Felted cattle hair.....	11.00	90	0.26	—	3.84	—	(1)
	Felted hair and asbestos.....	7.80	90	0.28	—	3.57	—	(1)
	Ground paper between two layers, each $\frac{1}{2}$ in. thick made up of two layers of kraft paper (sample $\frac{1}{2}$ in. thick).....	12.1	75	—	0.40	—	2.50	(4)
	Mineral-Wool.....	4.5	—	0.27	—	3.70	—	(4)
	See Table 1, Section C.....	—	—	—	—	—	—	—
	REFLECTIVE.....	—	—	—	—	—	—	—
INSULATING BOARD.....	Made from sugar cane fiber.....	13.5	70	0.33	—	3.03	—	(2)
	Made from hard wood fibers.....	15.20	70	0.32	—	3.12	—	(3)
	Made from wood fiber.....	15.90	72	0.33	—	3.03	—	(3)
	Made from wood fiber.....	15.00	70	0.33	—	3.03	—	(3)
	Made from wood fiber.....	—	52	0.33	—	3.03	—	(3)
	Made from wood fiber.....	15.20	90	0.33	—	3.03	—	(3)
	Made from wood fiber.....	16.90	90	0.34	—	2.94	—	(3)
	Made from licorice root.....	16.1	51	0.34	—	2.94	—	(3)
	$\frac{1}{2}$ in. insulating boards without special finish (eleven samples).....	16.5	90	0.33	—	3.03	—	(1)
	to.....	21.8	—	0.40	—	2.50	—	(4)
	1 in. insulating board ^a	13.2	—	0.34	—	2.94	—	(4)

See footnotes on first page of Table 2.

TABLE 2. CONDUCTIVITIES (*k*) AND CONDUCTANCES (*C*) OF BUILDING AND INSULATING MATERIALS—Concluded

These constants are expressed in Btu per (hour) (square foot) (Fahrenheit degree temperature difference.)
Conductivities (*k*) are per inch thickness and conductances (*C*) are for thickness or construction stated, not per inch thickness.

MATERIAL	DESCRIPTION	DENSITY (LB PER CU FT)	MEAN TEMP (FAHR DEG)	CONDUCTIVITY OR CONDUCTANCE		RESISTANCE		AUTHORITY
				(<i>k</i>)	(<i>C</i>)	Per Inch Thickness ($\frac{1}{k}$)	For Thickness Listed ($\frac{1}{C}$)	
INSULATING MATERIALS—(Continued) LOOSE FILL TYPE.....	Made from ceiba fibers.....	1.90	75	0.23	—	4.35	—	(3)
	Made from ceiba fibers.....	1.60	75	0.24	—	4.17	—	(3)
	Chemically treated wood fibers.....	4.0	75	0.28	—	3.57	—	(4)
	Fibrous material made from dolomite and silica.....	1.50	75	0.27	—	3.70	—	(3)
	Fibrous material made from slag.....	9.40	103	0.27	—	3.70	—	(1)
	Redwood bark.....	3.00	90	0.31	—	3.22	—	(1)
	Redwood bark.....	5.00	75	0.26	—	3.84	—	(3)
	Glass wool fibers 0.0003 in. to 0.006 in. in diameter.....	1.50	75	0.27	—	3.70	—	(3)
	Granular insulation made from combined silicate of lime and alumina.....	4.20	72	0.24	—	4.17	—	(3)
	Expanded vermiculite.....	7.0	70	0.48	—	2.08	—	(1)
	Regenerated cork about $\frac{1}{4}$ in. particles.....	8.10	90	0.31	—	3.22	—	(1)
	Hand applied granular mineral wool 2 in. to 6 in. thick, horizontal position ^b	6.05	—	0.30	—	3.33	—	(4)
	4 in. machine blown granular mineral wool, horizontal position ^b	7.13	—	0.33	—	3.03	—	(4)
	No covering.....	5.74	—	0.30	—	3.33	—	(4)
	Rock wool.....	10.0	90	0.27	—	3.70	—	(1)
SLAB INSULATIONS.....	Corkboard, no added binder.....	14.0	90	0.34	—	2.94	—	(1)
	Corkboard, no added binder.....	10.6	90	0.30	—	3.33	—	(1)
	Corkboard, no added binder.....	7.0	90	0.27	—	3.70	—	(1)
	Corkboard, no added binder.....	5.4	90	0.25	—	4.00	—	(1)
	Corkboard ^c	8.7	—	0.29	—	3.45	—	(4)
	Corkboard, asphaltic binder.....	14.5	90	0.32	—	3.12	—	(1)
	Chemically treated hog hair with film of asphalt.....	10.0	75	0.28	—	3.57	—	(3)
	Sugar cane fiber insulation blocks encased in asphalt membrane.....	13.8	70	0.30	—	3.33	—	(3)
	Made from shredded wood and cement.....	24.2	72	0.46	—	2.17	—	(3)
	Made from shredded wood and cement ^d	29.8	—	0.77	—	1.30	—	(4)
	Cellular glass.....	9.0	75	0.42	—	2.38	—	(1)
	Cellular glass.....	9.0	50	0.40	—	2.50	—	(1)

See footnotes on first page of Table 2.

ing. For increases of moisture content exceeding about 6 to 12 percent, the conductivity of frozen soil becomes progressively greater than that of the unfrozen soil.

Effect of Density. Density affects the thermal conductivity of a soil in about the same manner for all soils, at any moisture content, and for either the frozen or unfrozen condition. On the average, each one pound per cubic foot increase in dry density increases the thermal conductivity by about 3 percent.

Effect of Moisture. An increase in moisture content, up to the point of saturation, causes an increase in thermal conductivity. The rate of increase is indicated by the following values. Average conductivities, in Btu per (square foot) (hour) (Fahrenheit degree per inch), of four sands at a density of 110 lb per cu ft were: 6.8 at 2.5 percent moisture, 8.9 at 5 percent moisture, 11.2 at 10 percent moisture. Five soils of a fine texture at a density of 100 lb per cu ft, gave average conductivities of 6.7 at 10 percent moisture, and 9.5 at 20 percent. Thus, the doubling of moisture con-